REMARKS

In the Office Action dated April 6, 2005, the Examiner rejected claims 1-8, 11-12 and 14-18 under 35 USC 103 as unpatentable over by Tsuji (U.S. Patent No. 6,255,740) and Moden (US Patent 5,719,440), rejected claims 9, 10, and 13 under 35 USC 103 as unpatentable over Tsuji, Moden and Wang (US Patent 6,258,626), and rejected claims 19-21 under 35 USC 103(a) as unpatentable over Lin (U. S. Patent 5,830,800) in view of Moden. Claims 1 through 21 remain at issue.

35 USC 103 Rejections

The Examiner rejected certain claims as unpatentable over Tsuji and Moden. The Applicant strongly disagrees. The Examiner has failed to demonstrate a prima facie case of obviousness.

The present invention is directed to a novel semiconductor package wherein the active surface of a die is positioned downward so that its contact pads are placed in direct contact with posts of a lead frame. The package is then encapsulated in a molding compound.

Figures 19A through 21C of Tsuji are the most relevant to the present invention. In each of these Figures, the active or conductive surface of the semiconductor chip is always facing upward. The non-active surface of the chip is facing downward.

In Figures 19A and 19B for example, wire bonds 43 are used to electrically couple contact pads 41a (not visible) on the top or active surface of the semiconductor chip 41 to connecting portions 52a formed on frame terminal 27. See specifically Column 17, lines 38-42.

Figures 21A-21C show the same arrangement as Figures 19A and 19B, but after the portions 66 between the terminal portions 28A of the frame terminal are removed. See Column 17, lines 43-59.

The orientation of the die of Tsuji is therefore the opposite of the present invention. With Tsuji the active surface of the die is facing upward, whereas it is facing downward with the present invention.

In formulating the rejection, the Examiner completely misconstrued the actual teaching of Moden. The Examiner states that Moden teaches a number of features that are recited in the claims of the present application. A careful review of Moden reveals that the reference does not

teach the claimed features as stated by the Examiner.

Moden, in fact, teaches an adaptor package for flip chip die that does not conform or match the leads on the printed circuit board. The adaptor package includes, as best illustrated in Figure 1, a semiconductor die 12 having bond pads 15 formed on the inverted, active surface 14, of the chip. C4 solder bumps 16 (specifically see column 4, lines 3-5) are used to form electrical connections between the bond pads 15 of the die 12 and electrical contact elements 21 on the surface of an adaptor board 18. Circuit traces 23 are used to form electrical connections between the solder bump connections 16 and connectors 22 between the adaptor board 18 and a "master" board 30. A sealing compound 26 is then used between the die 12 and the adaptor board 18. See specifically column 4, lines 1-30 of Moden.

In the office action dated April 6, 2005, the Examiner states "*Moden discloses a chip package that contains a die (12) with a conductive side, plurality of lead posts (16) wherein the conductive side of the first die faces the plurality of lead posts and are mechanically and electrically connected to the lead posts with epoxy to a plurality of conductive pads (15).*" As noted above, however, the elements (16) of Moden are **not** lead posts. They are solder bump connections. Again, see column 4, line 3. The Examiner has therefore misconstrued the actual teaching of Moden. The proposed combination does not teach the present invention.

Furthermore, it is improper to combine the two reference in the manner suggested by the Examiner. It is well known that if combination of two references results in the inoperability of one or both references, then the combination is improper. In this case, Tsuji would be rendered inoperable. Assuming the die 41 of Tsuji was flipped upside down, then the contacts on the active surface of the die would be facing downward. Tsuji further teaches that a silver adhesive paste 42 (see column 17, line 37-39) is used to secure the die to the insulating layer 51b. This silver adhesive 42, however, would cause the contacts on the active surface of the die to short. As a consequence, the die of Tsuji would not operate.

In the rejection, the Examiner has thus (i) misconstrued the actual teaching of Moden; and (ii) combined the Tsuji and Moden references in an improper way. The claims rejected based on the combination of these two references are therefore allowable.

The Applicant also strongly disagrees with the Examiner with regard to the rejection of certain claims based on the combination of Lin and Moden. The Examiner has again misconstrued the actual teaching of Moden and has failed to demonstrate a prima facie case of obviousness.

Lin teaches a packaging method for ball grid array integrated circuits. The packaging method involves mounting a chip 40 with its active or non-conductive surface facing upward onto a thin copper sheet 10. Gold wires or wire bonds 41 are used to electrically connect contact pads on the top surface of the chip to projections 30 on the copper sheet 10.

With regard to Moden, the Examiner states "*Moden discloses a chip package that contains a die (12) with a conductive side, plurality of lead posts (16) wherein the conductive side of the first die faces the plurality of lead posts and are mechanically and electrically connected to the lead posts with epoxy to a plurality of conductive pads (15).*" As noted above, however, the elements (16) of Moden are **not** lead posts. They are solder bump connections. Again, see column 4, line 3. The Examiner has therefore misconstrued the actual teaching of Moden.

In contrast, the present invention relates to a lead frame having a plurality of posts and a plurality of semiconductor die, each of the plurality of die having conductive pads mounted onto the plurality of posts of the lead frame respectively. The teaching of the Lin reference is therefore the opposite of the present invention. The orientation of the active surface of the chip of Lin is facing upward, whereas with the present invention, the orientation of the chip is facing downward with its conductive pads in contact with the posts of the lead frame. The Lin reference therefore actually teaches away from the present invention and does not teach or suggest the present invention. With regard to Moden, the Examiner has misconstrued the reference in an attempt to find the present invention obvious. The claims rejected based on the combination of Lin and Moden are therefore allowable.

It is respectfully submitted that all pending claims are allowable and that this case is now in condition for allowance. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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